

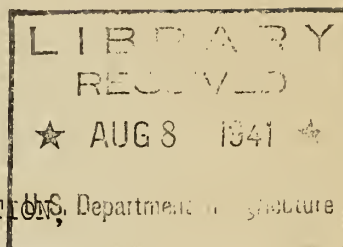
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U.S. Agricultural Marketing Service



REPORT ON SURVEY OF LARD PRODUCTION, DISTRIBUTION,
AND PACKAGING, 1938-39

By Meade T. Foster, Associate Marketing Specialist

Introduction

Increasing competition from vegetable oils and other fats and the loss of a large part of the United States export trade in lard have caused lard prices in recent years to decline to very low levels, thus creating a difficult economic problem for hog producers and hog slaughterers. In attempting to find ways of remedying the situation it has been suggested that the demand for lard could be improved if grade standards for the commodity were established and consumers were given the opportunity to buy it on the basis of grade or quality.

Before any very material progress can be made in formulating grade standards it is essential to have adequate information regarding the kinds of lard produced, the methods of rendering, refining, and handling, the containers used in packaging, and the various outlets to which the product goes as it moves through the channels of distribution. As detailed information of this kind was not readily available, the Agricultural Marketing Service in cooperation with the American Meat Institute undertook to obtain it direct from packers by use of a schedule or questionnaire. The information so obtained is summarized in this report.

Available records indicate that there are probably between 200 and 250 concerns that render lard in the United States which can be classified as wholesalers. Slightly more than half of these operate under the regulations of the Federal Meat Inspection Service. A small group operate three or more plants each, the two largest concerns having at least 25 plants each. Although questionnaires were returned by 79 concerns those of only 39 were sufficiently complete for use in preparing this report. These 39 concerns reported a total of 832,834,000 pounds of lard produced in the 12 months ending October 31, 1939, and a total distribution of 838,074,000 pounds. Their lard production was equivalent to 67 percent of that of the federally inspected plants during the same period. On the average, the lard produced under Federal inspection represents about 90 percent of all the lard produced by wholesale slaughterers and about 60 percent of the total lard produced in this country, including that from hogs

slaughtered on farms and in retail establishments. The operations of the 39 concerns included in this report were sufficiently large, therefore, to be considered as fairly representative of the industry as a whole, and it is believed that the information presented herein typifies the industry as it now operates.

Recent Steps Toward Standardization

In the absence of a generally recognized standard of quality for lard recent action towards that end is of interest.

The Bureau of Animal Industry of the United States Department of Agriculture in Amendment 13 to B.A.I. Order No. 211, Revised, effective November 1, 1940, established a standard of identity that defines "lard" and "rendered pork fat" which may be sold in interstate and foreign commerce. The new definitions follow:

Lard: The fat rendered from fresh, clean, sound, fatty tissues from hogs in good health at the time of slaughter, with or without lard stearine or hardened lard. The tissues do not include bones, detached skin, head fat, ears, tails, organs, windpipes, large blood vessels, scrap fat, skimmings, settlings, pressings, and the like, and are reasonably free from muscle tissue and blood.

Rendered Pork Fat: The fat, other than lard, rendered from clean, sound carcasses, parts of carcasses, or edible organs from hogs in good health at the time of slaughter, except that stomachs, tails, bones from the head and bones from cured or cooked pork are not included. The tissues rendered are usually fresh, but may be cured, cooked, or otherwise prepared and may contain some meat food products. Rendered pork fat may be hardened by the use of lard stearine and/or hardened lard and/or rendered pork fat stearine and/or hardened rendered pork fat.

In 1939 the meat packing industry approved a tentative standard for lard formulated by the American Meat Institute's Committee on Scientific Research. This standard was tried out on a voluntary basis for a period of 1 year. At the end of the trial period the industry adopted the tentative standards effective November 1, 1940. The provisions of the standard are quoted below:

Institute Standards for Pure Lard

1. Definition - Institute Standard Pure Lard shall be rendered from sound pork fat, handled in a clean and rapid manner. It shall, when it leaves the manufacturer's possession, meet the following specifications and conditions:

2. Moisture - The moisture shall not exceed two-tenths of 1 percent.
3. Suspended Matter - The lard shall be free from appreciable amounts of suspended matter, i.e., when melted it shall appear practically clear as viewed in a standard color tube.
4. Taste and Odor - The taste and odor shall be mild, sweet, and normal for pure lard.
5. Color - The color shall be that of pure lard correctly processed.
6. Free Fat Acids - The F.F.A. shall not exceed five-tenths of 1 per cent.
7. Stability - The stability shall not be less than 3 hours as determined by the peroxide method.

Production

Lard is extracted from certain of the fatty tissues of the hog by the application of heat during the rendering process. The method of applying heat in rendering varies considerably. Four distinct methods of rendering have been developed, each method producing a kind of lard with characteristics of flavor, aroma, color, texture, etc., that distinguish it from other kinds of lard. In each instance the lard produced is identified by the name of the process used.

Kettle-rendered lard represents the oldest known method of rendering. This method consists in the application of heat either direct or through a steam jacket to an open kettle. The fat is extracted from the tissue, the moisture is driven off in the process, and a lard of distinctive flavor and aroma results.

Steam-rendered lard is made by rendering the fat by direct contact with steam in a closed vertical tank or cylinder under a pressure of from 30 to 50 pounds. This method of rendering is adapted to converting large quantities of all kinds of fat into lard and accounts for approximately 85 percent of the lard produced under Federal inspection.

Dry-process rendered lard is made by cooking fats in a horizontal steam jacketed tank under vacuum. This method of rendering also is adapted to the conversion of all fats into lard. The cylinder or tank in which the fat is cooked, however, is smaller than that used in the steam-rendering process.

Neutral lard is rendered in a water-jacketed kettle and the fat is melted from the fiber or tissue by the slow heating of the water. Neutral lard is white in color and bland in flavor and is used largely for special purposes.

Steam rendering is the process in most general use in the packing industry, although one of the other rendering methods is used exclusively in most of the smaller establishments. Kettle rendering is quite popular in establishments producing relatively small quantities of lard. The use of the dry-rendering process is slowly growing in popularity. The relative importance of the several rendering processes as found in this study is indicated by the proportion of lard produced by each method as follows: Steam-rendered lard, 84.4 percent of the total; kettle-rendered lard, 9.4 percent; dry-process rendered lard, 5.8 percent, and neutral lard, 0.4 of 1 percent. (Table 4.)

Seasonal Variations in Lard Production

Under average conditions lard and rendered pork fat constitute 12 to 15 percent of the live weight of slaughter hogs; consequently the quantity of lard produced varies with changes in hog slaughter and changes in the average weight and quality of hogs marketed. The quantity of lard produced per hog increases when corn is plentiful and when the hog-corn price ratio is favorable for the profitable production of hogs. Conversely, the quantity of lard produced per animal decreases when corn is scarce or when the hog-corn price ratio is unfavorable for the profitable production of hogs.

Other factors, also, influence the quantity of lard produced by packers. For example, two of the primary wholesale cuts from the hog carcass, namely, the clear plate and the fat back are cured and sold as such or rendered into lard. When prices of these wholesale cuts are high in relation to the price of lard it is a general practice among packers to cure as large a quantity of them as the trade will absorb. On the other hand, when prices of clear plates and fat backs are low in relation to the price of lard the tendency is to convert most of these cuts into lard. Thus the demand for pork affects, to some extent, the quantity of fat converted into lard.

These factors, and perhaps others, influence the quantity of lard produced and contribute largely to the fluctuations in the yield of lard from hogs slaughtered under Federal inspection. During the last 10 years, the combined yield of lard and rendered pork fat per head of hogs federally inspected has fluctuated from a high of 35.7 pounds in 1933 to 25.0 pounds in 1937.

Lard production is greatest in November, December, and January and reflects heavy marketings of hogs from the spring pig crop during those months. In May and June the production of lard again increases, since hogs from the fall pig crop are normally marketed at that time.

To illustrate the relationship between hog slaughter and lard production, each is plotted for the 10-year period, 1930-39, in figure 1. In general, the curves are quite similar. Lard production for the period covered in this survey, also is shown in figure 1. Although this curve lacks the smoothness of the one for the 10-year period, the seasonal trend of each corresponds.

The monthly production of lard by the packers represented in this survey ranged from a high of 89,489,000 pounds in December 1938 to a low of 53,355,000 pounds in September 1939. (Table 1.) Production for December was equivalent to 10.7 percent of the total for the year and that for September represented 6.4 percent of the yearly production. In two other months - November and January - the quantity of lard produced also exceeded 10 percent of the total production for the year.

Grouping of Packers

In analyzing the reports obtained, a study was made of the lard operations of four groups of packers. The grouping of the packers was determined by the kind or kinds of lard rendered (table 2). In general, the manufacture of lard can be, and in the companies studied, was adapted to each process.

Included in one group were 12 packers that produced only steam-rendered or dry-process-rendered lard. This combination was decided upon because of the small number of reporting packers who rendered dry-process lard exclusively. In another group were 10 packers that produced only kettle-rendered lard. The third group included 10 packers that produced both steam- and kettle-rendered lard. In the fourth group were 7 packers that produced either three or all four of the well-known kinds of lard. Five of the packers in this last group rendered all four kinds of lard and of the other two, one rendered all but neutral lard and the other all but dry-process lard.

Lard Produced by Each Group

The average output of the group that produced kettle-rendered lard only, amounted to 867,000 pounds per year. The output of lard of the group that produced either steam- or dry-process-rendered lard exclusively, averaged 2,109,000 pounds per year. The quantity of lard from packers in the group that produced both steam- and kettle-rendered lard averaged 5,922,000 pounds annually. In the group that produced three and four kinds of lard the average production amounted to 105,659,000 pounds annually.

The production of lard by packers that rendered either steam- or dry-process lard apparently fluctuated relatively little from month to month (table 3). August was the month of high production by that group, when 9.5 percent of their lard was produced. The month of low output was February, when the quantity produced was 7.2 percent of the total. The output of packers who produced only kettle-rendered lard, also fluctuated little except for the month of October, when production was sharply higher than in any other month. The quantity produced in October was slightly more than 1 million pounds, while in other months production fluctuated between a low of 623 thousand pounds in February to 765 thousand in May. Production by packers who made both steam- and kettle-rendered lard, and by packers who produced three and four kinds of lard followed more closely the trend of total lard

production for all groups. The smaller packers usually produce only one kind of lard and hog slaughter in those plants fluctuates less seasonally than in the larger plants, hence the monthly lard production by the smaller packers tends to be more uniform.

Fats Used in Rendering

Considerable variation exists in the proportion of each kind of fat used in rendering the different kinds of lard, except that neutral lard was reported to be produced exclusively from "leaf fat." (Table 6.)

All fats were used in varying proportions in the production of steam-, dry-process-, and kettle-rendered lard. Since "cutting fat" is more largely used for rendering than any other kind, it is the predominating fat used in both steam-rendered and dry-process-rendered lard. It also is the predominating fat used in kettle-rendered lard by packers who produce only that kind of lard (table 7). Packers, however, who produced at least one other kind of lard besides kettle-rendered lard, used leaf fat predominantly for the latter kind. This gives rise to the belief that packers who produce more than one kind of lard consider kettle-rendered lard as somewhat of a specialty and consequently use the more desirable raw fats in producing it.

Promptness in rendering fat after slaughter is an important factor in determining the ultimate quality of lard, because free fatty acids begin to develop in the fat tissue immediately after slaughter. If the fat is rendered without undue delay lard of low free fatty acid content is produced. Lard with a low free fatty acid content has a relatively high smoke point. The majority of the packers reporting in this study rendered fats rather promptly. (Table 8.) Of the 37 packers reporting on leaf fat, 17 rendered it the same day the hogs were slaughtered and a total of 26 rendered this fat within 24 hours after slaughter. For killing fats, 25 out of 36 packers reported that they rendered the day of slaughter and a total of 30 rendered within 24 hours of that time. Thirty-eight packers reported for cutting fats, 14 of whom rendered this fat within 24 hours after slaughter and a total of 29 within 48 hours. It should be noted that, in general, the smaller packers or those that produce only one kind of lard render raw fats less promptly than do the larger packers or those that produce two or more kinds of lard. (Table 9.) The larger packers doubtless have an advantage in this respect since they slaughter large numbers of hogs and consequently do not need to hold fats until a sufficient quantity has accumulated to charge the rendering vat.

Distribution

Statistics of the Bureau of Animal Industry have demonstrated the seasonal nature of lard production. Those of the Agricultural Marketing Service relating to the quantity of lard in storage have given some insight into the months in which production exceeds consumption and vice versa. To know the average quantity of lard in



storage on the first of each month during the 10-year period, 1930-39, (figure 2) throws considerable light on the storage problem as related to lard. It should be noted that storage stocks of lard increase from the first of January to the first of August, then decrease rather sharply during the remainder of the year.

Lard that has been properly processed and stored at a temperature under 60°F. can be held in storage for a considerable period of time without showing appreciable depreciation in quality. Conversely, lard that has been carelessly made and improperly stored shows an appreciable depreciation in quality during the storage period. That the holding of lard in storage for long periods is not a desirable practice is generally recognized in the trade. This is evidenced by the fact that packers insofar as possible reduce storage holdings sharply in the late summer and early fall before the beginning of the new hog marketing year on the first of October. Furthermore, trading regulations on the Chicago Board of Trade prescribe the deliverable period, on contract, of lard processed from October 1 to December 31 and that processed from January 1 to September 30. This study indicates (table 1) that the distribution of lard by packers fluctuates less from month to month than production. In August and February the distribution of lard is greater than for other months. The proportion of the total reported distributed in those months was 10.5 percent and 9.2 percent, respectively. March was the month of smallest distribution when 7.4 percent of the lard was reported to have moved. For the purpose of contrast it should be recalled that the month of highest production was December, and that September was the month of smallest production.

Information on the distribution of lard to the various users of this important shortening agent is not generally available. It is well known, however, that in some instances the price of lard is an important factor governing its use. With many users, particularly those who have specific purposes for it, lard is selected in preference to other shortening agents regardless of price. But with others, price is an important factor and this group uses lard only when the price in relation to other edible fats is considered favorable. Therefore, the quantity of lard going into the different consumptive channels probably varies somewhat from year to year.

Quantity of Lard Disposed of Through Various Channels

The distribution of lard to the various users as reported by ^{1/} packers (table 11) was as follows: distribution trade, 50.6 percent^{1/}; bakeries, 21.6 percent; export, 21.2 percent; refineries, 3.7 percent; board of trade, 1.8 percent^{2/}; plant manufacturing, 0.2 percent; other users, 0.7 percent; storage, 0.2 percent^{3/}. These figures are representative of packer sales of lard and although indicative do not necessarily represent the exact proportion of lard actually taken by the different groups of users.

^{1/} Chain and independent distributors, wholesalers, jobbers, institutions, etc.

^{2/} Quantity actually delivered.

^{3/} Storage represents the increase or decrease in holdings at the end of the fiscal year as compared with those at the beginning of the year.

Distribution of Different Kinds of Lard

In the distribution of steam-rendered lard (table 12) 50.0 percent of the unrefined product went for export; 29.0 percent to the distribution trade; 13.0 percent to refineries; and 9.0 percent for board of trade deliveries. Of the refined steam-rendered lard approximately 55.0 percent went to the distribution trade; 20.0 percent to bakeries; and 20.0 percent for export. Kettle-rendered lard was distributed largely to bakeries and the distribution trade, 59.0 percent going to the former and about 40.0 percent to the latter. Neutral lard was distributed as follows: 43.0 percent to bakeries; 24.0 percent to plant manufacturing; 19.0 percent for export; and 19.0 percent to the distribution trade.

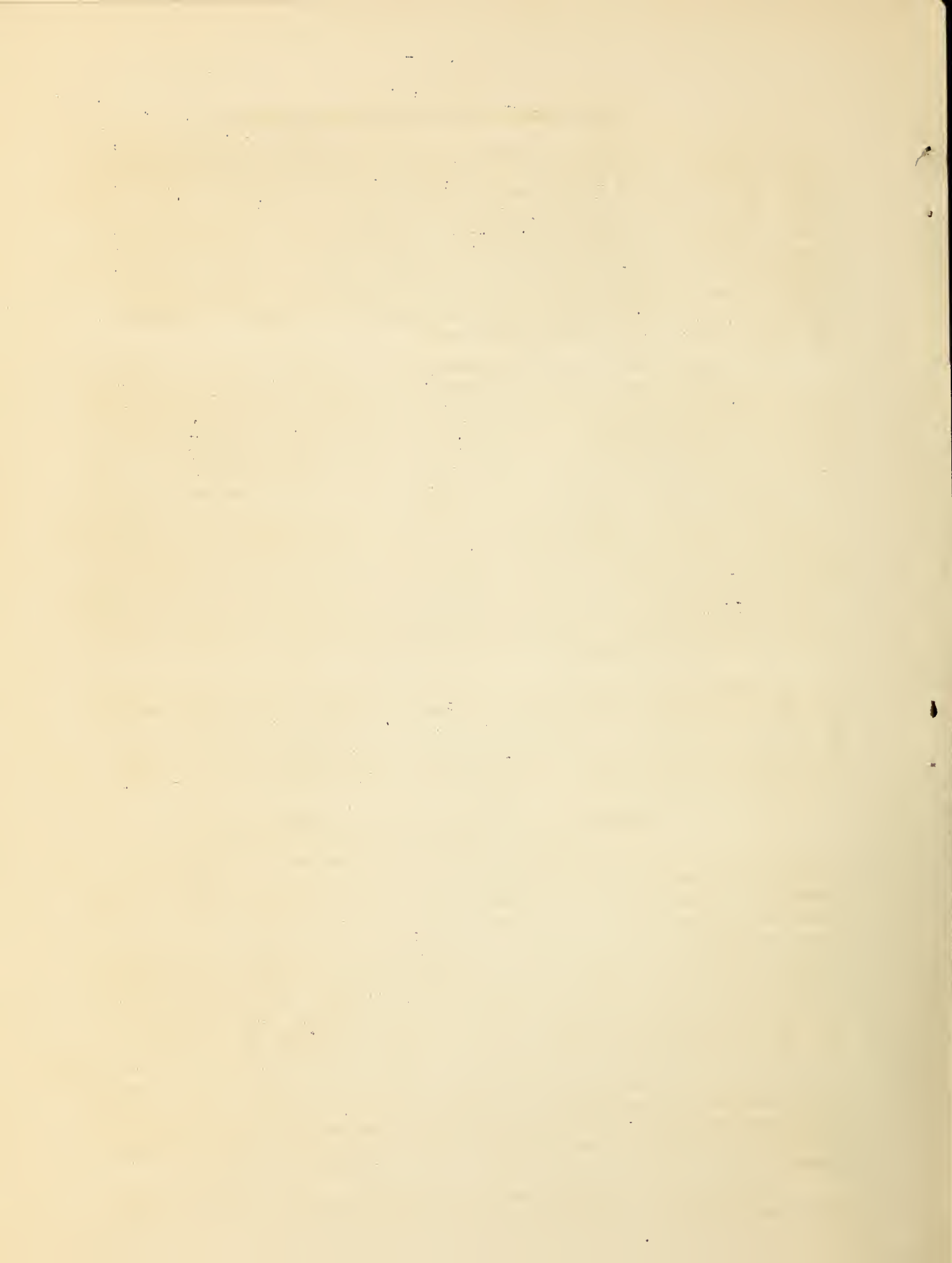
The distribution of lard by packers on the basis of kind or kinds of lard produced is shown in table 3. Packers who produced only steam-rendered or dry-process-rendered lard reported large distributions in December and October and small distributions in January and February. The proportion of the yearly total distributed in January was 4.0 percent, whereas for December it was 14.4 percent. Those who produced only kettle-rendered lard distributed relatively large quantities during August and September. Throughout the remainder of the year the distribution of lard by this group of packers fluctuated but little from month to month. The distribution of lard by packers who produced both steam- and kettle-rendered lard fluctuated considerably from month to month, the peak coming in December and the low point in February. Distribution of lard by packers who processed three or four kinds of lard corresponded rather closely with the pattern of total lard distribution. The peak month of distribution for this group was August, and the months of smallest distribution were December and March.

Packers who handle a large volume of lard are more likely to attain a wider distribution of that product among its various users than packers who do a small volume of business. This statement is well supported by information in table 13, which indicates that the group of packers who processed more than one kind of lard sold it to more users than the packers who processed only one kind of lard.

Distribution on Basis of Kinds of Lard Produced

On the basis of the grouping of packers according to the kind or kinds of lard produced (table 13) the distribution trade, refineries, and export trade got most of the unrefined steam lard from the packers who produced only steam-rendered or dry-process-rendered lard exclusively. The distribution trade got 82.0 percent and bakeries 17.0 percent of the refined steam lard. The small number of packers who rendered dry-process lard refined the product and sold it to the distribution trade and bakeries, 58.0 percent to the former and 42.0 percent to the latter. Packers who produced only kettle-rendered lard disposed of the bulk, or 84.0 percent of it, through the distribution trade and 11.0 percent to bakeries. In the group that rendered both steam and kettle lard, 51.0 percent of the unrefined steam product went to the distribution trade and 40.0 percent for board of trade sales; whereas 86.0 percent of the refined steam lard went to the distribution trade and the remainder to bakeries and the export trade. Approximately three-fourths of the kettle-rendered lard produced by this group of packers went to the distribution trade and one-fourth to bakeries.

In the group of packers who produced three or four kinds of lard, 88.0 percent of the unrefined steam lard went for export and 8.0 percent



was sold to refineries. One-half of the refined steam lard was disposed of through the distribution trade, and one-fifth each went to bakeries and the export trade. The unrefined dry-process lard was distributed three-fourths to bakeries and one-fourth to refineries. The dry-process refined lard was distributed two-thirds to the distribution trade and one-third to bakeries. The distribution trade received one-fourth of the kettle-rendered lard from this group of packers and bakeries received nearly three-fourths. The distribution of neutral lard was approximately two-fifths to bakeries, one-fifth to the export trade, one-fourth to plant manufacturing, and one-eighth to the distribution trade. In many instances smaller quantities of lard than those referred to went to other users of lard.

Buying Lard

Buying lard apparently is not practiced to any considerable extent by the producers of lard (table 10). The quantity reported purchased by the firms studied represents approximately 2.5 percent of their annual lard production, and most of this was reported by the larger packers.

Packaging

The merchandising of most articles of food has undergone many changes during the last two decades. Many reasons have been advanced for these changes and doubtless all of them have some bearing on the subject. Perhaps the one explanation advanced more frequently than others is the so-called change in our way of living. This is a broad, general statement and subject to many interpretations. In general, its sponsors support their explanation by pointing to the wide use of automobiles, the smaller families, the greater number of persons living in apartment houses, the growing tendency for both husband and wife to work, et cetera. The influence of these factors in changing old methods of merchandising obviously cannot be measured or even approximated.

Such changes in reality represent an evolutionary process over a period of many years rather than an immediate, revolutionary one, as some think when a change in the method of doing business is introduced. Much of this evolutionary process represents progress in merchandising methods. Some of the most pronounced progressive changes can be attributed to the advent of Federal and State grade standards which recognize degrees of quality in the product offered for sale. Another important factor in effecting changes in methods of merchandising doubtless is the rather widespread use of self-service stores.

Years ago the storekeeper bought such articles as lard, sugar, coffee, prunes, pickles, potatoes, eggs, butter, and many others in bulk, then resold them to his customers in the quantity desired. Today these articles are packed in attractive containers of various sizes and purchasing consists largely of selecting the size container desired. In many instances a statement of the quality and grade of the product appears on the container.

In modern food merchandising the maximum of sales appeal is obtained by prominently displaying the articles offered for sale. Naturally keen competition has developed among distributors and processors as each strives to package his product in the most attractive and useful container.

Lard intended for retail distribution, especially in the urban centers, usually is packaged in an economical carton. Packers, however, continue to use small pails to some extent but the cost of these is considerably higher than for the cartons. More recently there has been a slight increase in the use of tin cans with a removable top as containers for lard. The packers who use this type of container place considerable emphasis on the re-use feature of the can.

Although the butter-type carton with a paper liner is the one used most extensively for packaging lard, it has not been completely satisfactory from the customer's standpoint. In filling the carton, lard too frequently comes in contact with the outside of the liner. The lard oil then penetrates to the outside of the carton resulting in a greasy surface. This is an annoyance to the housewife who handles the carton or attempts to remove the liner in order to place the lard in a refrigerator dish.

A casual perusal of trade magazines during recent years impresses one with the importance of having containers for lard to be sold at retail attractive and of conveniently small size. But packers realize that packaging alone, although important, will not win and hold customers for lard. Consequently an announcement of some improvement in the quality of lard usually accompanies an announcement of a new or redesigned container. The great competition in the shortening field accounts for many changes in both packaging and methods of selling.

Replies to a question relating to the importance of cartons for lard distributed at retail, showed a wide variation in the practice followed by packers. Although no attempt has been made to determine or analyze the reasons for the variations, it perhaps is safe to state that such variations in the use of containers for lard distributed through similar channels reflect a difference in the type of consumer, differences in consumer buying practices, differences in merchandising practices, and many other variations that could be mentioned.

In the group of packers that processed either steam-rendered or dry-process-rendered lard exclusively, some reported that none of the lard for retail distribution was packaged in cartons; others reported that all the lard intended for retail distribution was packaged in cartons. For the entire group approximately 28 percent of the lard for retail distribution was packaged in cartons. (Table 18.)

For the group that processed kettle-rendered lard only, the variation in the quantity of lard packaged in cartons was not so great as reported above but the actual quantity so packaged was not easily determined because of a discrepancy in replies to two related questions. In one instance the quantity of lard so packaged was given as 13.5 percent, whereas in another instance the quantity packaged in cartons was given as 29.7 percent. By striking an average for the two replies, however, it appears that this group of packers probably package in cartons approximately 21 to 22 percent of the lard intended for retail distribution.

The group of packers who processed both steam- and kettle-rendered lard packaged in cartons approximately one-third of the lard intended for retail distribution. One operator in this group did not package any lard in cartons and another reported that 75 percent of that establishment's lard was distributed to the retail trade so packaged.

Packers who processed three or four kinds of lard were the most consistent users of the carton container for retail distribution. This group included those who are the largest processors of lard; consequently considerable significance is attached to the fact that approximately 60 to 62 percent of their lard for retail distribution was packaged in cartons.

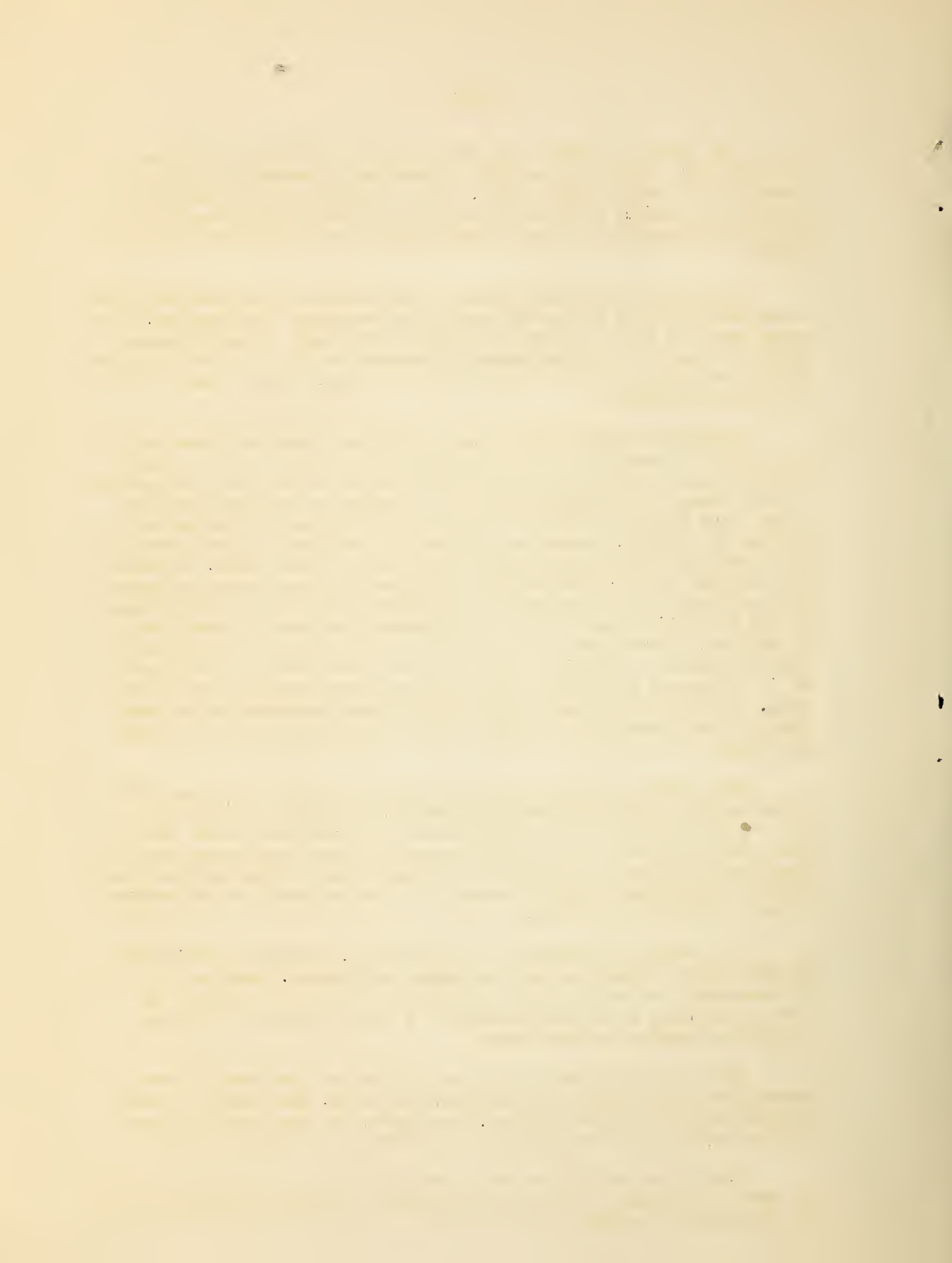
Because of insufficient data to compute a weighted average for all groups of packers who distributed lard in cartons to the retail trade, it was considered best to report on the above basis the replies on this means of lard distribution. It should be recalled that the above facts indicate there is a progressive increase in the use of cartons by packers, grouped on the basis of the kind of lard produced, in relation to the average annual production of each group. Packers who produced kettle-rendered lard only have the lowest average production per year of the four groups of packers and package from approximately 20 to 21 percent of the lard intended for retail distribution in cartons. Packers who produced three or four kinds of lard have the highest average production of lard per year and package approximately 60 to 62 percent of the lard intended for retail distribution in cartons. A few of the latter group reported more extensive use of cartons 5 years previous to the time of the survey than when the survey was made.

Many other containers were used by all groups of packers for packaging lard for the distribution trade, the most important by far being 50-pound cans and 55-60-pound and 65-80-pound tubs. (Table 17.) The proportion of the lard packaged in these containers for the distribution trade by all groups of packers except those who processed three or four kinds of lard, exceeded by a wide margin the proportion of lard packaged in cartons.

In packaging lard for the bakery trade, extensive use is made of the larger containers, such as drums and tierces. Some use is made of large cans and tubs but the proportion of the total packaged in these containers is relatively small. A small quantity of lard is shipped to bakeries in tank cars.

For the export trade, the most popular and extensively used containers were tierces, square tins, and boxes. The group of packers who produced steam- or dry-process lard, however, reported extensive use of the pound carton as a container of lard for export.

The larger containers were used exclusively for storage, board of trade deliveries, for the transportation of lard to refineries, and in plant manufacturing.



Summary

1. The seasonal variation in lard production follows closely the seasonal changes in hog marketing. Lard distribution shows less seasonal variation than production and tends to vary conversely with production.

2. A relatively small percentage of the commercial production of lard is produced by packers who make only one kind of lard. A large percentage of commercial production is produced by packers who make at least some of the four kinds of lard.

3. Nearly 85 percent of the lard produced was steam lard, 9 percent kettle-rendered, and 6 percent dry-process-rendered. The quantity of neutral lard produced constituted less than 1 percent of the total.

4. The percentage of each kind of fat used in the manufacture of the different kinds of lard varied materially, depending upon the kind of lard made and the number of kinds produced by the packers by whom it is made. Leaf fat constituted 66 percent and cutting fat 34 percent of the fat used in making kettle-rendered lard by those who made all kinds of lard. Cutting and killing fat constituted 88 percent and leaf fat only 7 percent of the fat used by the same group in making steam lard.

5. A large percentage of the packers whose production was included in the study rendered their killing fats the same day they were produced; their leaf fat within 24 hours, and their cutting fat within 12 to 48 hours after the hogs were slaughtered.

6. Lard purchased by packers constituted a very small percentage of their operations.

7. Slightly more than 50 percent of all the lard included in the study was disposed of through the distributing trade. Bakeries took 25 percent, and practically the same quantity was sold for export. Other items of distribution were relatively unimportant. Nearly three-fourths of the prime steam lard rendered by those making all kinds of lard was sold to the distribution trade, and nearly three-fourths of kettle-rendered lard of the same group was sold to bakeries.

8. More lard was delivered to the distribution trade in 40- to 50-pound cans than in any other type of container. One pound containers ran next in importance. The use of these small containers has increased materially in recent years. Except for the distribution trade, where large numbers of pails and small containers were used, a very large percentage of the lard produced was packaged and sold in large containers.

Table 1. - Lard: Production and distribution by 39 packers,
by months,
November 1, 1938 - October 31, 1939

	Production		Distribution	
	1,000 lb.	Percent <u>1/</u>	1,000 lb.	Percent <u>1/</u>
November	83,831	10.1	67,978	8.1
December	89,489	10.7	63,337	7.6
January	85,915	10.3	69,522	8.3
February	65,464	7.8	76,794	9.2
March	63,068	7.6	61,691	7.4
April	59,879	7.2	65,008	7.7
May	76,356	9.2	71,757	8.6
June	66,711	8.0	69,438	8.3
July	60,523	7.3	72,227	8.6
August	62,432	7.5	88,444	10.5
September	53,355	6.4	63,520	7.6
October	65,811	7.9	68,358	8.1
Total	832,834	100.0	838,074	100.0

1/ Percentages based on total numbers.

Table 2. - Total lard production reported on basis of kind of lard rendered, average production for packers reporting, and number of establishments.

November 1, 1938 - October 31, 1939

	Steam or dry-process only	Kettle- rendered only	Steam and kettle	Steam, kettle, dry-process, neutral
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Total annual production	25,304	8,666	59,225	739,616
Average annual production	2,109	867	5,922	105,659
Number of packers	12	10	10	7

Table 3. - Production and distribution by kind of lard rendered by 39 packers,
by months,
November 1, 1938 - October 31, 1939

	Production			Distribution		
	Steam or dry-process: only	Kettle- rendered: only	Steam and kettle dry-process: neutral	Steam or dry-process: only	Kettle- rendered: only	Steam and kettle dry-process, neutral
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
November	1,965	665	75,251	1,366	192	5,572
December	2,045	682	80,243	2,517	184	6,108
January	2,094	651	77,339	700	184	5,843
February	1,815	623	58,934	955	171	4,008
March	2,202	688	55,427	1,513	190	4,442
April	1,931	746	53,350	1,299	195	4,138
May	2,256	765	68,171	1,551	212	4,773
June	1,977	743	58,385	1,198	199	5,517
July	2,038	642	53,743	1,678	186	4,645
August	2,398	672	54,937	1,624	248	4,986
September	2,316	723	46,315	1,374	232	4,266
October	2,267	1,060	57,821	1,762	211	5,019
Total	25,304	8,665	739,616	17,537	2,454	59,317
	Percent	Percent	Percent	Percent	Percent	Percent
November	7.8	7.7	10.2	7.8	7.8	9.4
December	8.1	7.9	10.8	14.4	7.5	10.3
January	8.3	7.5	10.4	4.0	7.5	9.8
February	7.2	7.2	8.0	5.4	7.0	6.8
March	8.7	3.0	7.5	8.6	7.3	7.5
April	7.6	8.6	7.2	7.4	7.9	7.0
May	8.9	8.8	9.2	3.9	8.6	8.0
June	7.8	3.6	7.9	6.8	8.1	9.3
July	8.0	7.4	7.3	9.6	7.6	7.8
August	9.5	7.7	7.4	9.3	10.1	8.4
September	9.1	3.4	6.3	7.8	11.5	7.2
October	9.0	12.2	7.8	10.0	8.6	8.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Percentages based on total numbers.

Table 4. - Total production and quantity produced of specified
kinds of lard by 39 packers,
November 1, 1938 - October 31, 1939

Kind of lard	Production	
	<u>1,000 lb.</u>	<u>Percent</u>
Steam-rendered	702,885	84.4
Dry-process-rendered	48,305	5.8
Kettle-rendered	78,225	9.4
Neutral	3,396	0.4
Total	832,811	100.0

Table 5. - Production of lard on the basis of kind of lard rendered by 32 packers and total for each group,
November 1, 1938 - October 31, 1939

	Production			
	Steam or dry-process only	Kettle- rendered only	Steam and kettle	Steam, kettle, dry-process, neutral
	<u>1,000 lb.</u>	<u>1,000 lb.</u>	<u>1,000 lb.</u>	<u>1,000 lb.</u>
Steam-rendered	23,654	-	53,863	625,369
Dry-process	1,650	-	-	46,654
Kettle-rendered	-	8,666	5,362	64,197
Neutral	-	-	-	3,396
Total	25,304	8,666	59,225	739,616
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Steam-rendered	93.5	-	91.0	84.5
Dry-process	6.5	-	-	6.3
Kettle-rendered	-	100.0	9.0	8.7
Neutral	-	-	-	0.5
Total	100.0	100.0	100.0	100.0

Table 6. - Approximate percentage of specified fats used by
39 packers, in making different kinds of lard,
November 1, 1938 - October 31, 1939

Kind of fat	Steam rendered	Dry-process- rendered	Kettle- rendered	Neutral
	Percent	Percent	Percent	Percent
Lean fat	7.9	10.4	56.4	100.0
Cutting fat	66.5	77.0	39.7	-
Killing fat	21.7	11.6	3.5	-
S.P. & D.S. fats ^{1/}	3.9	1.0	0.4	-
Total	100.0	100.0	100.0	100.0

^{1/} Survey completed prior to November 1, 1940, when a Bureau of Animal Industry regulation prohibiting the use of bones and certain fats in rendering lard became effective.

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Table 8. - Approximate time that elapses from slaughter of hogs until various fats are rendered; number of packers reporting for each period,

November 1, 1938 - October 31, 1939

	: Same	: 12-24	: 24-48	: 48-72	: 72-96
	: day	: hours	: hours	: hours	: hours
	: <u>Number</u>	: <u>Number</u>	: <u>Number</u>	: <u>Number</u>	: <u>Number</u>
Leaf fat	: 17	: 9	: 6	: 3	: 2
Killing fats	: 25	: 5	: 5	: 1	: -
Cutting fats	: 1	: 13	: 15	: 7	: 2

Table 9. - Approximate time that elapses from slaughter of hogs until various fats are rendered on basis of kind of lard rendered; number of packers reporting for each period, November 1, 1938 - October 31, 1939.

Same day		12-24 hours		24-48 hours		48-72 hours		72-96 hours											
Steam: Steam: Steam:		Steam: Steam: Steam:		Steam: Steam: Steam:		Steam: Steam: Steam:		Steam: Steam: Steam:											
or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :	or Ket-: and dry, :										
dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:	dry : tle: ket-:ket-: dry tle: ket-: ket-: dry tle: ket-: kettle: dry tle: ket-: kettle: dry tle:										
only:only: tle: tle, :	only:only: tle: tle: only:only: tle: tle: only: only: tle: only: only: tle: neu-: only: only:	only:only: tle: tle, :	only:only: tle: tle: only:only: tle: tle: only: only: tle: only: only: tle: neu-: only: only:	only:only: tle: tle, :	only:only: tle: tle: only:only: tle: tle: only: only: tle: only: only: tle: neu-: only: only:	only:only: tle: tle, :	only:only: tle: tle: only:only: tle: tle: only: only: tle: only: only: tle: neu-: only: only:	only:only: tle: tle, :	only:only: tle: tle: only:only: tle: tle: only: only: tle: only: only: tle: neu-: only: only:										
: neutral:	: neutral:	: neutral:	: neutral:	: neutral:	: neutral:	: neutral:	: neutral:	: neutral:	: neutral:										
No. No.	No. No.	No. No.	No. No.	No. No.	No. No.	No. No.	No. No.	No. No.	No. No.										
Leaf	5	1	5	6	2	4	3	-	-	1	1	1	1	1	1	1	1	1	1
Kill-																			
ing																			
fats:	8	1	9	7	2	3	-	-	1	4	-	-	1	-	-	-	-	-	-
Out-																			
ting:																			
fats:	1	-	-	-	3	3	3	4	3	4	5	3	4	1	2	-	-	1	1

Table 10. - Lard purchased by groups of packers and total quantity purchased,
November 1, 1938 - October 31, 1939

	:	<u>1,000 lb.</u>
By packers rendering steam or dry-process only	:	none
" " " kettle only	:	102
" " " steam and kettle	:	630
" " " steam, kettle, dry, and neutral	:	20,874
Lard purchased, total	:	21,656

Table 11. - Distribution of lard by 39 packers through various outlets,
November 1, 1938 - October 31, 1939

	:	<u>1,000 lb.</u>	:	<u>Percent</u>
Distribution trade ^{1/}	:	411,241	:	50.6
Bakeries	:	175,521	:	21.6
Export	:	172,429	:	21.2
Refineries	:	29,739	:	3.7
Board of trade ^{2/}	:	14,988	:	1.8
Plant manufacturing	:	1,356	:	0.2
Other users	:	5,700	:	0.7
In storage	:	7 1,696	:	7 0.2
Total	:	812,670	:	100.0

^{1/} Includes chain and independent distributors, wholesalers, jobbers, institutions, etc.

^{2/} Includes only the quantity actually delivered.

Table 12. - Distribution of specified kinds of lard by 39 packers through various outlets,
November 1, 1938 - October 31, 1939

	Steam-rendered		Dry-process rendered		Kettle-rendered		Neutral	
	Unrefined	Refined	Unrefined	Refined	Unrefined	Refined	Unrefined	Refined
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Distribution trade								
Bakeries	20,495	365,109				6,929	18,226	481
Export	2,201	137,008		4,052		3,591	27,179	1,500
Refineries	39,751	131,733				288		658
Board of trade	10,032	18,313		1,394				
Plant manufacturing	7,444	7,250					294	
Other users	-	487					24	845
In storage	-645	5,700						
		1,785		101		122	332	
Total	79,278	667,385		5,547		10,930	46,046	3,484
	Percent	Percent		Percent		Percent	Percent	Percent
Distribution trade								
Bakeries	25.8	54.7				63.4	39.6	13.8
Export	2.8	20.5		73.0		32.9	59.0	43.0
Refineries	50.1	19.7				2.6		18.9
Board of trade	12.7	2.7						
Plant manufacturing	9.4	1.1		25.2			0.6	
Other users	-	0.1					0.1	24.3
In storage	- 0.8	0.9						
		0.3		1.8		11.1	0.7	
Total	100.0	100.0		100.0		100.0	100.0	100.0

ts, by 39 packers, according to groups on basis
of lard rendered,
- October 31, 1939

Kettle		Steam, dry-process, kettle, and neutral									
		Steam					Dry-process				
ad: Kettle		Unrefined		Refined		Unrefined		Refined		Kettle	
lb. 1,000 lb.		1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
3	2,500	141	332,228	-	-	6,013	9,967	481			
4	756	894	133,865	4,052	2,926	288	25,655	1,500			
0	-	35,647	123,026	-	-	-	-	658			
-	-	3,120	18,313	1,394	-	-	-	-			
-	-	-	7,250	-	-	-	-	-			
-	24	-	487	-	-	-	-	845			
-	-	-	5,700	-	-	-	-	-			
-	422	4662	41,752	4101	4122	4267		-			
7	3,302	40,464	628,621	5,547	9,349	35,889	3,484				
it: Percent		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
	75.7	0.4	52.8	-	64.3	27.8	13.8				
	22.9	2.2	21.3	73.1	31.3	71.5	43.0				
	-	88.1	20.5	-	3.1	-	18.9				
	-	7.7	2.9	25.1	-	-	-				
	-	-	1.2	-	-	-	-				
	0.7	-	0.1	-	-	-	24.3				
	-	-	0.9	-	-	-	-				
	40.7	41.6	40.3	41.8	41.3	40.7	-				
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0				

Table 13. - Distribution of lard, through various outlets, by 39 packers, according to groups on basis of kind of lard rendered,
November 1, 1938 - October 31, 1939

	Steam or dry-process only			Kettle-			Steam and kettle			Steam, dry-process, kettle, and neutral		
	Steam			rendered:			Steam			Steam		
	Unrefined:	Refined:	Percent:	Unrefined:	Refined:	Percent:	Unrefined:	Refined:	Percent:	Unrefined:	Refined:	Percent:
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Distribution trade	8,385	6,538	-	5,760	11,969	26,343	2,500	141	332,228	-	6,013	9,967
Bakeries	128	1,399	-	758	1,178	1,744	756	894	133,865	4,052	2,926	25,655
Export	2,561	47	-	-	1,542	2,660	-	35,647	129,026	-	288	-
Refineries	5,732	-	-	-	1,180	-	-	3,120	18,313	1,394	-	-
Board of trade	-	-	-	295	7,444	-	-	-	7,250	-	-	-
Plant manufacturing	-	-	-	-	-	-	24	-	487	-	-	-
Other users	-	-	-	-	-	-	-	-	5,700	-	-	845
In storage	-1,344	433	-	443	438	-	422	4662	41,752	4101	4122	4267
Total	15,462	8,017	-	6,856	23,351	30,747	3,392	40,464	628,621	5,547	9,349	35,889
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Distribution trade	54.2	81.6	-	84.0	51.3	85.7	75.7	0.4	52.8	-	64.3	27.8
Bakeries	0.8	17.4	-	11.1	5.0	5.7	22.9	2.2	21.3	73.1	31.3	71.5
Export	16.6	0.6	-	-	6.6	8.6	-	88.1	20.5	-	3.1	-
Refineries	37.1	-	-	-	5.0	-	-	7.7	2.9	25.1	-	-
Board of trade	-	-	-	4.3	31.9	-	-	-	1.2	-	-	-
Plant manufacturing	-	-	-	-	-	-	0.7	-	0.1	-	-	-
Other users	-	-	-	-	-	-	-	-	0.9	-	-	-
In storage	- 8.7	40.4	-	40.6	40.2	-	40.7	41.6	40.3	41.8	41.3	40.7
Total	100.0	100.0	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 14. - Kind, size, and number of containers filled with specific kinds of lard, reported by 39 packers, November 1, 1938 - October 31, 1939

Containers	: Steam : refined : Number	: Dry-process: : refined : : Number	: Kettle : : Number	: Neu- : : tral : : Number	: Total : Number
Tank cars	: 465:	: -:	: 142:	: -:	: 607
Tierces	: 98,465:	: 1,478:	: 10,346:	: 3,596:	: 113,885
Drums:	: :	: :	: :	: :	: :
Q Lox	: 194,030:	: 979:	: 13,832:	: -:	: 208,841
Returnable	: 80,750:	: 7,064:	: 33,345:	: -:	: 121,159
100-120 lb.	: 228,791:	: 5,104:	: 26,597:	: -:	: 260,492
Tubs:	: :	: :	: :	: :	: :
65-80 lb.	: 155,318:	: 2,928:	: 45,239:	: -:	: 203,485
55-60 lb.	: 249,355:	: 2,069:	: 15,794:	: -:	: 267,218
Cans (45-50 lb.)	: 1,280,729:	: 24,708:	: 259,764:	: -:	: 1,565,201
Sq. tins (25-37 lb.)	: 586,992:	: -:	: 693:	: -:	: 587,685
Boxes:	: :	: :	: :	: :	: :
60 lb.	: 6,450:	: -:	: -:	: -:	: 6,450
28-30 lb.	: 1,236,335:	: 3,650:	: -:	: -:	: 1,239,985
27½ lb.	: 40,610:	: 1,515:	: -:	: -:	: 42,125
Large pails:	: :	: :	: :	: :	: :
110 lb. tin	: 252:	: -:	: -:	: -:	: 252
50 " "	: 2,229:	: -:	: 71:	: -:	: 2,300
20-25 lb. tin	: 104,883:	: -:	: 4,734:	: -:	: 109,617
20-28 " wood	: 124,244:	: 2,782:	: 3,078:	: -:	: 130,104
Small pails:	: :	: :	: :	: :	: :
9 lb.	: -:	: -:	: 287:	: -:	: 287
8 "	: 4,991,102:	: 110,142:	: 226,288:	: -:	: 5,327,532
7 "	: 17,210:	: -:	: -:	: -:	: 17,210
5 "	: 46,849:	: -:	: 2,048:	: -:	: 48,897
4 "	: 5,742,454:	: 84,292:	: 434,714:	: -:	: 6,261,460
3 "	: 132,130:	: -:	: 1,530:	: -:	: 133,660
2 "	: 517,152:	: 10,784:	: 196,910:	: -:	: 724,846
1 "	: -:	: 1/28,656:	: -:	: -:	: 28,656
Cartons:	: :	: :	: :	: :	: :
8 lb.	: 2,926,141:	: 84,958:	: 11,596:	: -:	: 3,022,695
4 "	: 15,884,788:	: 689,846:	: 89,577:	: -:	: 16,664,211
2 "	: 18,410,643:	: 367,019:	: 242,980:	: -:	: 19,020,642
1 "	: 147,585,770:	: 2,246,795:	: 2,200,270:	: -:	: 152,032,835
½ "	: 245,300:	: -:	: -:	: -:	: 245,300

1/ Plant reporting failed to report for this container in subsequent tables.

Table 15. - Kind, size, and number of containers filled with specified kinds of lard reported by groups of packers on basis of kind of lard rendered in 39 establishments.

November 1, 1938 - October 31, 1939

Containers	Steam or dry-process only			Steam and kettle			Steam, dry-process, kettle, neutral		
	Steam- refined	Dry-rendered	Number	Kettle only	Steam- refined	Number	Kettle	Steam- refined	Dry-process refined
Tank cars	Number	Number	Number	Number	Number	Number	Number	Number	Number
Tierces	212	-	-	1	-	252	142	-	-
Drums:	6,125	1,372	-	9,707	7,662	372	267	106	3,596
Returnable	2,990	-	-	787	31,780	602	12,443	979	-
100-120 lb.	845	275	-	2,577	3,647	716	29,952	6,789	-
Tubs:	-	-	-	2,735	17,738	4,070	19,792	5,104	-
65-80 "	1,816	2,514	-	230	32,583	36,200	8,809	414	-
55-60 "	42,759	-	-	4,865	75,268	10,929	-	2,069	-
Cans (45-50 lb.)	7,398	324	-	129,660	182,214	55,039	75,065	24,384	-
Sq. tins (25-37 lb.)	-	-	-	166	18,026	527	-	-	-
Boxes:	-	-	-	-	-	-	-	-	-
60 lb.	-	-	-	-	47,603	-	-	-	-
28-30 lb.	-	-	-	-	2,700	-	-	3,650	-
27½ "	-	-	-	-	252	-	-	1,515	-
Large pails: 110 lb. tin	-	-	-	-	-	-	-	-	-
50 " "	-	-	-	-	2,229	-	-	-	-
20-25 lb. tin:	217	-	-	2,536	10,415	2,198	-	-	-
20-28 " wood:	1,997	722	-	12,467	-	626	2,452	2,060	-
Small pails:	-	-	-	287	-	-	-	-	-
9	7,332	-	-	44,444	373,358	35,458	146,386	110,142	-
8	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-
5	269	-	-	2,048	-	-	-	-	-
4	14,415	-	-	59,507	425,918	108,850	266,357	84,292	-
3	-	-	-	1,530	-	-	-	-	-
2	6,868	-	-	-	2,130	142,513	54,397	10,784	-
1	-	-	-	-	-	-	-	1/28,656	-
Cartons:	200	-	-	10,245	122,080	1,351	-	84,958	-
8	100,732	157,946	-	67,455	1,142,396	22,122	-	531,900	-
4	55,626	-	-	221,394	1,619,726	21,586	-	367,019	-
2	2,855,953	88,962	-	651,194	8,186,459	229,898	1,319,178	2,157,833	-
1 ½	29,420	-	-	-	-	-	-	-	-

1/ Plant reporting failed to report for this container in subsequent tables.

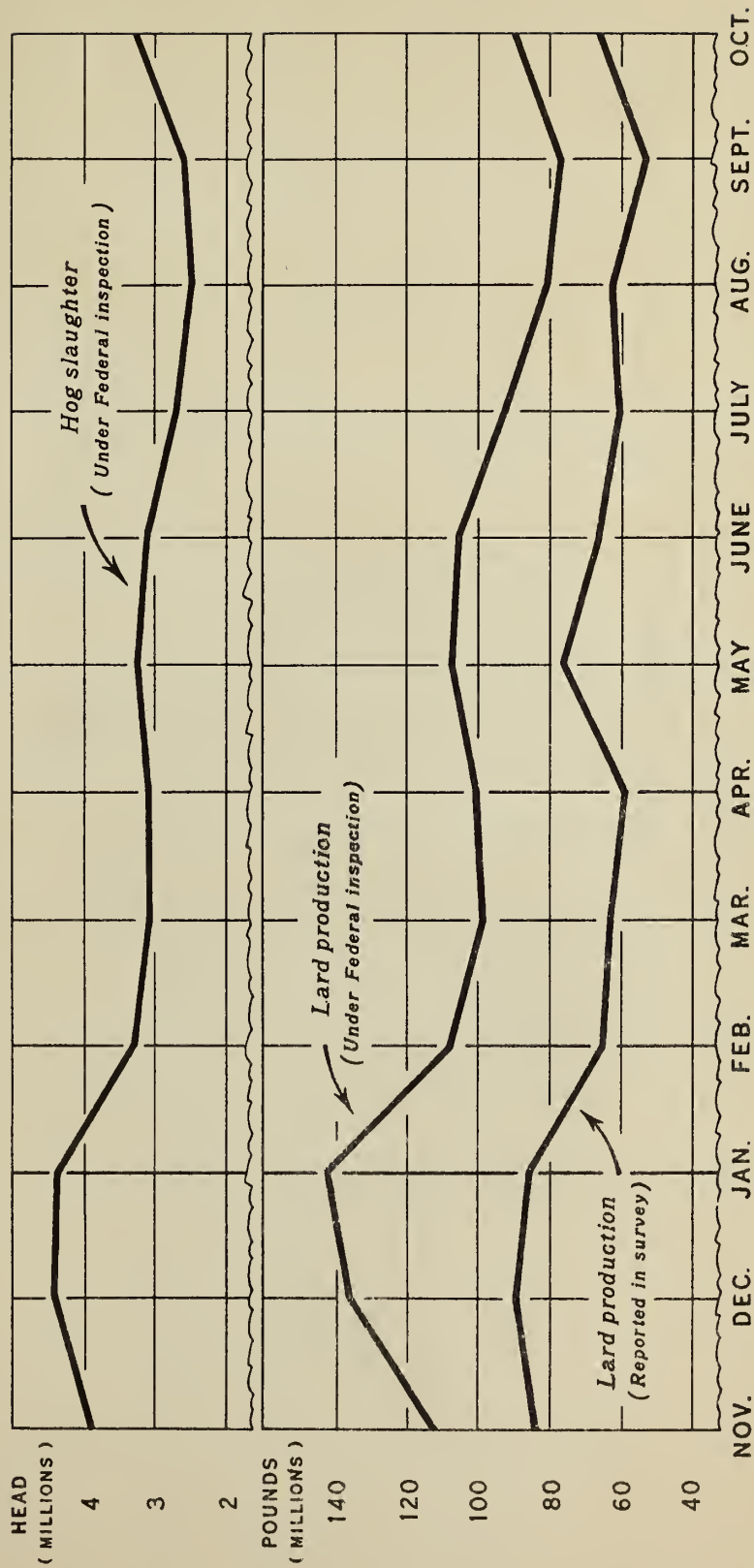
Table 16. - Percentage distribution of lard to the various outlets, according to containers used by 39 packers, November 1, 1938 - October 31, 1939

[illegible]

Table 18. - Approximate percentage of lard for retail distribution packaged in cartons, for specified periods by number reporting, and by groups of packers on basis of kind of lard rendered in 39 establishments, November 1, 1938 - October 31, 1939

	: :1938-39	: :Reports	: :1934-35	: :Reports	: :1930-31	: :Reports
	: :Percent	: :Number	: :Percent	: :Number	: :Percent	: :Number
Steam and dry-process, only:	27.6	11	21.9	10	17.8	9
Kettle-rendered, only	13.5	8	4.6	5	4.6	5
Steam and kettle	34.6	10	21.3	10	16.0	10
Steam, dry-process, kettle,						
and neutral	62.2	6	62.6	5	36.2	5

HOG SLAUGHTER AND PRODUCTION OF LARD UNDER FEDERAL INSPECTION, 10-YEAR AVERAGE 1929-39, AND PRODUCTION OF LARD REPORTED IN LARD SURVEY, 1938-39

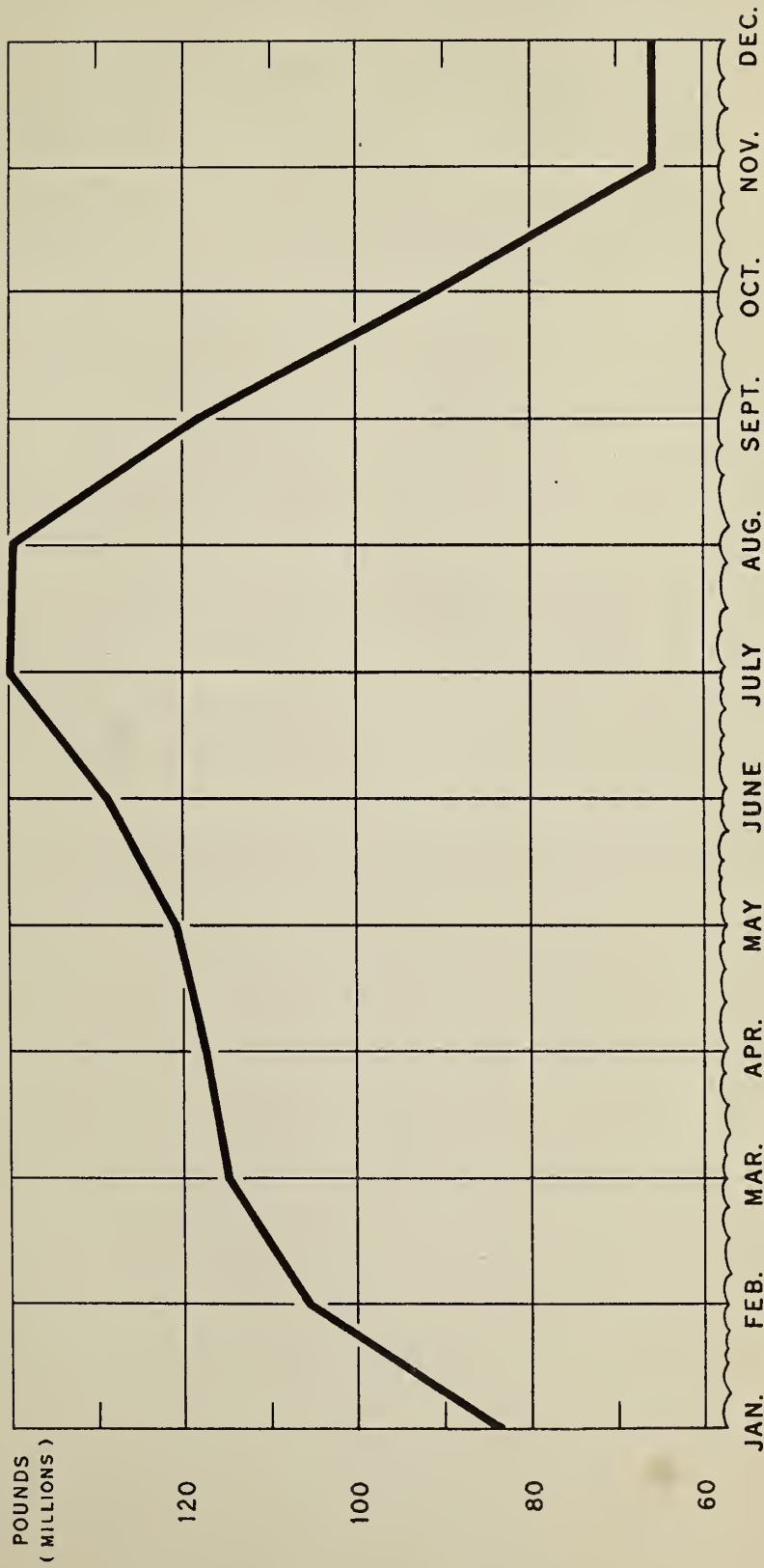


U. S. DEPARTMENT OF AGRICULTURE

NEG. 403 AGRICULTURAL MARKETING SERVICE

FIGURE 1

STORAGE HOLDINGS OF LARD, 10-YEAR AVERAGE, 1930-39



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FIGURE 2

